

# **Measuring the Vocabulary Development of New Entrant Children: A Pilot Study**

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## **Abstract**

For children who are learning to read, it is of the upmost importance that vocabulary knowledge is acquired in a timely fashion. Adequate vocabulary knowledge enables children to comprehend the majority of words in a text and this, in turn, influences reading and overall school success. Children who have delayed vocabulary at the point of school entry may increasingly fall behind their peers as reading demands increase. The identification of these children is necessary, yet despite its importance, vocabulary development is not being assessed in a systematic manner in new entrant classrooms. In this study, five receptive vocabulary tests were piloted with 46 new entrant children from four primary schools in the Christchurch area. The purpose of the study was to determine whether it was possible to develop a procedure that could identify children with delayed vocabulary development in an accurate and economical way. The results suggested that none of the four piloted tests were suitable for screening new entrants. These results highlight the need for a closer look at vocabulary testing at this age level.

## **Chapter 1**

### **Introduction and Literature Review**

In today's world, it is of the utmost importance that children become proficient readers at an early age. Reading is one of the major ways in which knowledge is obtained. A proficiency in reading allows children to accrue important domain knowledge that directly influences success both in the school setting and across the life span (Lonigan, 2007). Unfortunately, a significant proportion of young children are failing to learn to read in a timely fashion. Cosgrave, Bennie and Kerslake (2002), estimated that 20 to 25 percent of New Zealand children between five and six years of age were being referred to Reading Recovery and other remedial reading services. In a more recent sample in the United States from the National Assessment of Education Progress, only 32 percent of children aged 10 performed at or above the proficient level of reading (Lonigan, 2007). One of the key factors that influences early reading success is early vocabulary knowledge.

### **Vocabulary Development in the Acquisition of Reading Skills**

The ultimate goal in learning to read is being able to read with fluency and comprehension. Comprehension can be defined as understanding what is being read which allows children to derive meaning from written text. In order to read with comprehension, children first need to master a number of component skills in a sequential order.

Church (2014) outlines the hierarchical nature of the skills that must be acquired in order to ensure reading competency. The sequential order of these skills is illustrated in Figure 1. Firstly, children must acquire alphabet knowledge and letter discrimination skills, that is, the ability to distinguish between each of the 52 lower and upper case letters in the English alphabet. Next, children need to acquire phonemic awareness or phoneme



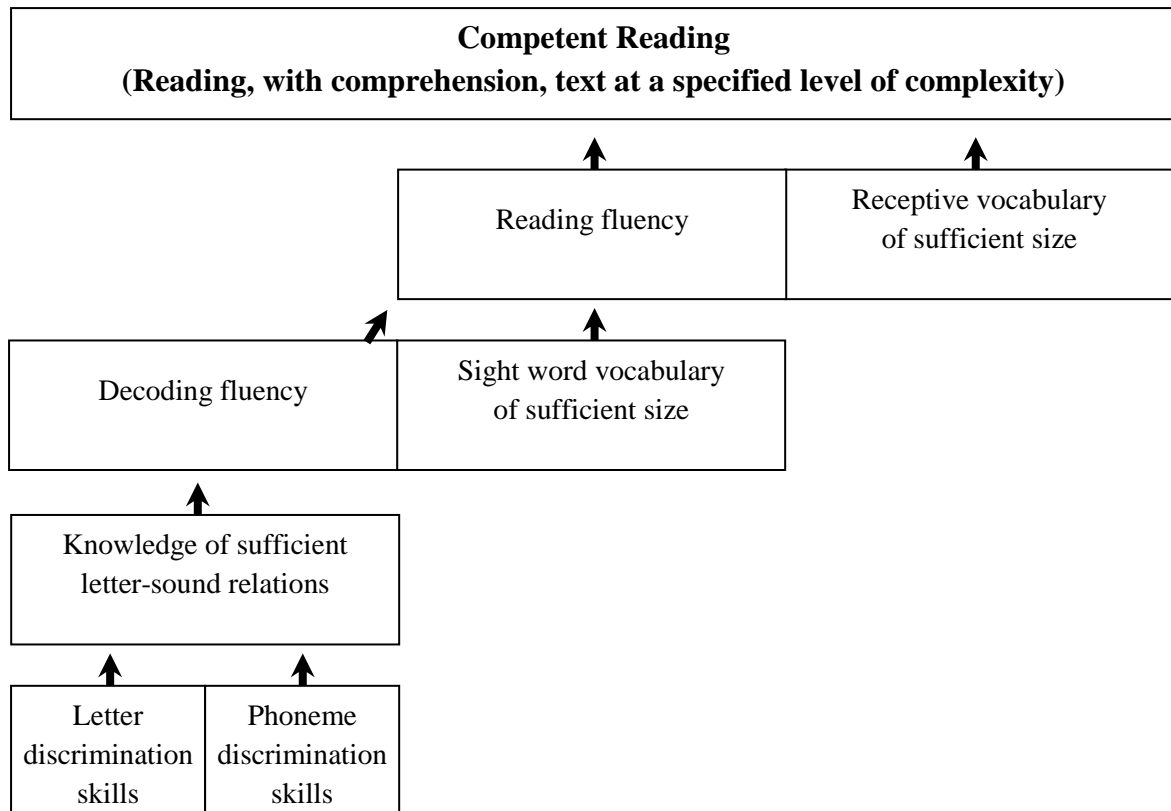


Figure 1. The developmental sequence for reading acquisition

discrimination skills. This is the ability to distinguish between and pronounce each of the 37 phonemes in the English language. The child then needs to learn the letter-sound relationships. This is often referred to as “phonics”. With knowledge of the common letter-sound relations, children can begin to decode written text – translating a word from print to speech. Once a child has acquired a reasonable level of decoding fluency and has built a sufficient level of sight word vocabulary – words that can be recognised immediately and automatically – they can begin to read text with fluency. This is the ability to read text quickly, accurately, and with proper expression. After 5 years of schooling the average child is able to read at a rate of about 130 words per minute with fluency. Vocabulary knowledge plays an integral role in the acquisition of reading skills; if many word meanings are understood, learning to read proceeds much more rapidly (Church, 2014).

## **Vocabulary, Comprehension, and Reading Success**

Adequate vocabulary development during the preliterate years is of paramount importance to a child's future success in learning to read. Receptive vocabulary refers to all the words – spoken, written, or manually signed – that a person can comprehend and respond to. Expressive vocabulary refers to all the words that a person is able to use while speaking or writing (Burger & Chong, 2011). Receptive vocabulary develops prior to expressive vocabulary and in young children, their receptive vocabulary can be as much as four times that of their expressive vocabulary, that is, they can understand many more words than they can produce (Jolongo & Sobolak, 2011).

Although it has received less attention than the relationship between decoding and reading, the relationship between vocabulary knowledge and reading comprehension is just as important (Becker, 1977; Biemiller, 2003, 2006; Biemiller & Boote, 2006; Cunningham & Stanovich, 1997; Jolongo & Sobolak, 2011; Kearns & Biemiller, 2010; Mixan, 2014; Nation, 2014; Nation et al., 2010; Poe, Burchinal, & Roberts, 2004; Stahl & Fairbanks, 1986; Wright, 2012). In fact, there is evidence to suggest that vocabulary knowledge is a stronger predictor of comprehension and overall reading success than phonological knowledge (Roth, Speece, & Cooper, 2002). Phythian-Sence and Wagner (2007) write: "Acquiring the vocabulary we use for thinking and communicating is a linguistic achievement of nearly incomprehensible importance and complexity". Furthermore, it is also a skill that takes many years to master.

There are a number of studies that highlight the important relationship between vocabulary development and reading comprehension. Roth, Speece, and Cooper (2001) studied the development of 39 children from a United States sample. These children were administered a battery of tests examining different areas of oral language in order to examine the relationship between oral language and early reading skills. During their 3-year

longitudinal study, children received a battery of tests in kindergarten, grade 1, and grade 2. It was found that level of reading comprehension at grade 2 was best predicted by level of expressive vocabulary and word definitions as measured by the oral language subtest of the Test of Language Development and the Boston Naming Test administered in kindergarten.

In a longitudinal study by Cunningham and Stanovich (2007), the receptive vocabulary levels of 56 first-grade children from an elementary school in Canada were orally assessed using the Peabody Picture Vocabulary Test. Ten years later the same test was administered to the same group of children in grade 11. It was found that first-grade vocabulary levels accounted for approximately 33 percent of the reading comprehension variance in grade 11.

In an extensive longitudinal study, Nation et al. (2010) examined the reading and language skills of 242 children. Assessments began three months after the children's fifth birthday with further assessments occurring at 5.5, 6, 7, and 8 years of age. Fifteen children in the sample who had poor comprehension were matched with 15 control children. It was found that the poor comprehenders demonstrated normal levels of reading accuracy and fluency throughout the study. At 8 years, the phonological skills of poor comprehenders were indistinguishable from the phonological skills of the control group. However, their reading comprehension was poor at each assessment period. The findings of these studies highlight the importance of vocabulary development for the development of reading comprehension during the primary school years.

Scarborough, Neuman, and Dickinson (2009) have put forward compelling evidence for the effect of vocabulary development on later comprehension in a meta-analysis of 61 research samples. Both expressive and receptive vocabulary were found to be strong predictors of reading ability in later years, especially in Year 3 and 4 of primary school. This review concluded that children who have an impoverished vocabulary upon school entry will

continue to have an impoverished vocabulary in subsequent years. For every year that passes, it becomes more difficult for children to ‘catch up’ to their peers and more likely that these children will experience reading failure. This observation identifies a clear need to identify those with delayed vocabulary development as early as possible.

### **The Matthew Effect and the Fourth Grade Slump**

Children who begin to fall behind with respect to literacy development, often fall further and further behind as they move through primary school. This phenomenon is referred to as the Matthew Effect or the accumulating advantage phenomenon. The term Matthew Effect derives its name from the biblical Parable of Talents in the book of Matthew "For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath" (Hirsch, 2003). In essence, the rich get richer and the poor get poorer.

The Matthew Effect is visible at an early age. When children begin school there are already significant differences amongst children with some children understanding twice as many words as other children (Hirsch, 2003). This initial difference is largely determined by influences in the home environment. Prior to starting school, children almost exclusively acquire their vocabulary incidentally. The number of complex sentence structures, different words, and total number of words that are spoken by the parents has a large influence on the development of a child’s vocabulary (Hart & Risley, 1995). On average, low income parents expose children to far fewer words and simpler sentences than middle class parents. However, children from working class families may have vocabulary levels as high as those from professional families in cases where they experience the same level of interaction with parents (Hart & Risley, 1995).

Children who begin school with a large vocabulary will be more likely to become proficient readers. For these children reading is more likely to be a rewarding experience. Their adequate vocabulary knowledge allows them to engage in reading more often, they acquire more word meanings as they read and therefore, over time, they become even better readers than they were previously (Stanovich, 1986). The reverse is true of children with limited vocabularies. Children with restricted vocabularies may be less likely to seek out the reading experiences that could improve their reading ability and their vocabulary knowledge. Nagy and Scott (2000) have reported that adequate reading comprehension relies on the reader understanding between 90 and 95 percent of what is being read. Knowing the meanings of the majority of the words in a text enables the reader to comprehend more of what is being read. This in turn allows meanings of any unknown words to be inferred from the context in which they are used and over time more accurate meanings of the words are acquired. Conversely, a child with an impoverished vocabulary understands less of what is being read and therefore cannot acquire vocabulary at the same rate as the more advanced reader. Over time it becomes increasingly unlikely that the child who is poor at reading will ever catch up to their reading proficient peers without timely intervention. Hirsch (2003) has estimated that the advantaged child who initially knew the meanings of twice as many words as his or her disadvantaged peer will, by the end of secondary school, know around four times as many words and their meanings.

One of the stages when the influence of the Matthew Effect in vocabulary becomes most apparent is during the child's fourth year of primary education. This stage is known in the literature as the 'fourth-grade slump'. At this time, vocabulary knowledge becomes a significant predictor of reading success as the vocabulary demands of school texts begin to increase (Biemiller, 2003, 2006). Chall and Jacobs (2003) describe this time as the point where "learning to read" shifts to "reading to learn". It is at this point that children with

impoverished vocabularies begin to experience major difficulties in comprehending content material. Content material that is full of expository text - such as the material found in textbooks - at this point shifts to using a large amount of content-specific vocabulary that some children may never encounter or use in their everyday language or have experience with. Children are unlikely to comprehend expository text if they do not understand many of the words they are reading.

### **Vocabulary Testing in New Zealand Schools**

In New Zealand, the standardised Observation Survey of Early Literacy Achievement also known as the Six Year Net is administered to children around the time they turn 6 years of age. The Six Year Net is a one-on-one observational test that takes approximately 45 minutes to administer and assesses children on the following six tasks relating to reading and writing: concepts about print, letter identification, word reading, writing vocabulary, phonemic awareness and spelling knowledge, and reading level as measured by running records (Clay, 2005). Vocabulary level is not assessed. Children who score in the bottom 25 percent are identified as struggling readers and are in most cases referred to Reading Recovery for 12 to 20 weeks of individualised remedial reading instruction with the aim of assisting them to gain the skills necessary to catch up to their peers (Nicholson et al., 1999).

In 1997, the School Entry Assessment (SEA) was introduced into New Zealand schools by the Ministry of Education with the aim of promoting a standardised assessment procedure that could be used by New Zealand teachers to assess the knowledge and skills of new entrant children in three different domains: literacy, numeracy, and oral language. The aim was that the information gathered would be used by teachers to plan teaching and learning activities for new entrant children. Additionally, information gathered across classes and schools could be relayed back to the Ministry of Education to create an overall national

picture of learning and development in new entrant children as well as informing the allocation of resources across the country.

In 2000, Dixon and Williams (2000) investigated the way in which the SEA was being implemented in New Zealand by conducting brief 45-minute interviews with new entrant teachers across 10 schools in Auckland, New Zealand. Teachers identified several issues related to the implementation of the SEA. These included difficulty in administering the SEA while managing a classroom full of children, finding the SEA to be too time consuming, difficulties in scoring and interpretation, a feeling that the SEA was not comprehensive enough, and concerns about the costs and time required to train staff to use the SEA. While the overall sentiment of the majority of teachers was that a comprehensive standardised entry assessment was wanted, the SEA, for many teachers, fell short of what was desired.

During subsequent years a small number of evaluation reports were published by the Ministry of Education in which similar findings were reported. By 2001, over half (59 percent) of all primary schools were using the SEA although less than one third were sending the Ministry of Education yearly school summary reports (Davies, 2001). In 2003, 576 schools across New Zealand were asked to complete two questionnaires asking teachers about their views of the SEA. Some of the criticisms of the SEA were that it was too limited in scope, that it was in need of upgrading or modification, and that the oral language component – Tell Me About It – was time consuming and difficult to administer and score (Dewar & Telford, 2003).

An evaluation of the technical and methodological aspects of the SEA kit was undertaken by Anderson, Lindsey, Schulz, Monseur, and Meiers (2001). The authors

concluded that the test-retest reliability of the SEA was poor and was being compromised due to inconsistencies in administration and in the interpretation of scores.

In New Zealand, vocabulary testing for children at school entry is not undertaken in any systematic fashion and attempts to provide a standardised assessment tool have been less than satisfactory. Schools have been left to decide how to approach the problem of assessing vocabulary in this age group which results in children with impoverished vocabularies slipping under the radar. Given what is known about the relationship between vocabulary development and reading success, there appears to be a clear need to examine the vocabulary measures which are currently available in order to determine whether there is a test or combination of tests that could provide a solution to this problem.

### **Review of Existing Vocabulary Measures for Young Children**

Twelve vocabulary measures were examined and reviewed for suitability in the present study. The research literature on each of the tests was examined as well as an overview of the tests that were available in test libraries at the University of Canterbury. The following is an overview of the twelve vocabulary measures suitable for young children. These have been arranged in following order: receptive vocabulary tests, expressive vocabulary tests, and oral language tests.

#### *The Peabody Picture Vocabulary Test, 4<sup>th</sup> Edition*

The PPVT-4 (Dunn & Dunn, 2007) is widely considered to be the gold standard for measuring receptive vocabulary. The current and previous editions have been used extensively in the literature for over 50 years in a wide variety of studies and populations. The current version (PPVT-4) was standardised on a representative United States sample of more than 5,500 individuals aged 2:6 to 90+ and all validity and reliability coefficients are



greater than .90 (Dunn and Dunn, 2007). The test-retest reliability coefficient for the PPVT-4 is high at .93.

The PPVT-4 consists of 228 coloured pictures which are contained in 19 different 12-item sets of increasing difficulty. The participant is asked to point to or say the number of one of the four pictures displayed on each page. The starting set is dependent on the individual's age and the finishing set is the first set in which the participant makes 8 or more errors. Extensive standardised scores are provided as well as norms for each 6 month age bracket for boys and for girls.

In addition to its widespread clinical use, the PPVT-4 has been used extensively as a measure against which other measures of vocabulary can be compared. Often the validity of new measures is examined by comparing the results of the new vocabulary measure against results on the PPVT-4. For instance, Callahan (2011) used the PPVT-4 to look at the validity of the Montgomery Assessment of Vocabulary Acquisition (MAVA). In this study, the correlation between MAVA and PPVT-4 scores were too low to validate the new measure.

The PPVT-4 can be and has been used in studies with young children. For example, Allison, Robinson, Hennington, and Bettagere (2011) used the PPVT-4 to examine sex differences in receptive vocabulary among 30 low SES African American preschool aged children (mean age of 4.52 years). A more recent study by Xu, Chin, Reed, and Hutchinson (2014) used the PPVT-4 in a longitudinal study to measure the early language and literacy skills of 248 preschool children between the ages of three and five who underwent an early literacy intervention. The PPVT-4 is a robust measure of vocabulary development at this age.

### *The Two-Question Vocabulary Measure*

In 2010, Gail Kearns and Andrew Biemiller validated a method for assessing the vocabulary levels of children in the primary grades (Kearns & Biemiller, 2010). This method – called the Two-Questions Vocabulary Measure (TQVM) – was an attempt to develop a measure which could be used to assess vocabulary in groups or whole classrooms of children. The impetus for developing the TQVM came from the need for an assessment measure that was more practical than the current method of testing one child at a time.

The TQVM consists of 22 words that have been derived from the PPVT-3. For each word there is a question that the administrator asks the group or classroom, for example, “Is a banana a fruit?” Each child is given a response sheet with which they can circle a smiling face for yes and a frowning face for no. A second set of 22 words is used on a different day of testing; these 22 words are the same words used in the first set, however the correct response is the opposite of the correct the response in the first set. Both questions for each word need to be correct to be marked as a correct answer. This is done to ensure that the chance of guessing a correct response remains the same as the PPVT-3 at .25. Using this approach, Kearns and Biemiller (2010) were able to assess a whole classroom of children in a small amount of time.

To validate the TQVM, 259 children across three New England elementary schools were assessed and individual scores on the TQVM were compared with scores on the PPVT-3. Kearns and Biemiller found an overall correlation of  $r = .78$  between raw scores on the TQVM and PPVT-3. For kindergarten aged children alone, this correlation was also high with a correlation of  $r = .77$ . One of the difficulties in implementing the TQVM included the time taken to teach the children how to respond to “yes/no” questions and how to mark their answer sheets. No test-retest reliability data is available for the TQVM.

### *The Bracken Basic Concept Scale – Revised*

The BBCS-R (Bracken, 1998) is a measure of receptive vocabulary that examines a child's understanding of a range of basic concepts such as colours, letters, numbers/counting, sizes, comparisons, and shapes.

The psychometric properties and technical aspects of the BBCS-R have been outlined in a test review by Bradley-Johnson (1999). Standardisation for the BBCS-R took place between 1996 and 1997, and normative data was gathered on a representative United States sample of 1,100 participants aged between 2:6 and 7:11 years. In terms of reliability, the BBCS-R has reported internal consistency correlations between .96 and .99 for the overall test. Test-retest reliability correlations have ranged between .87 and .88. The concurrent validity of the BBCS-R has been examined on a number of occasions by comparing results on the BBCS-R with results on the Peabody Picture Vocabulary Test-Third Edition, the Boehm Test of Basic Concepts-Revised and the Preschool Language Scale-3. Moderate to high correlations were found on all three occasions.

In an earlier study, Breen (1985) examined the concurrent validity of the earlier edition, the BBCS by looking at correlations with the PPVT-R. Twenty four participants with a mean age of 6 years and 4 months from a United States sample were tested. A correlation of .67 was obtained between scores on the BBCS and PPVT-R (Bradley-Johnson, 1999).

The BBCS-R has more recently been used as an outcome measure in an evaluation of the Bracken Concepts Development Programme (Wilson, 2004). In this study, 54 children were administered the BBCS-R before and after the programme being implemented. The results of this study support the use of the BBCS-R as an accurate evaluation measure that can be used with young children.

### *Testyourvocab*

Testyourvocab is an online procedure that assesses vocabulary knowledge and provides an overall measure of vocabulary size. Testyourvocab consists of three parts. The first part presents the user with a broad range of words which can each be selected if the word is known to the user. The second part consists of a greater number but narrower set of words based on the users responses in part one. The third part consists of a brief survey. After all three stages have been completed the user is presented with an estimation of overall vocabulary size. The Testyourvocab procedure can be administered to younger children. Age-based normative data is provided, however these are unlikely to be reliable due to sampling biases. No reliable psychometric data exists for the Testyourvocab procedure.

### *Receptive and Expressive One-Word Picture Vocabulary Tests, 4<sup>th</sup> Edition*

The ROWPVT-4 and the EOWPVT-4 (ROWPVT-4, EOWPVT-4; Brownell, 2010) are individually administered tests that assess receptive and expressive language skills in individuals aged 2 to 80+; each test is a counterpart to the other. In the receptive vocabulary test, the individual is asked to match a spoken word with a coloured image of an object, action, or concept. In the expressive vocabulary test, the individual is asked to name an object, action, or concept with a single word when presented with a coloured image. Normative data is provided and is based on a sample of over 2000 individuals. Administration time for each test is approximately 15-25 minutes depending on the abilities of the individual (Brownell, 2010).

Gray, Plante, Vance, and Henrichsen (1999), examined the diagnostic accuracy of four different vocabulary tests for identifying children with specific language impairment. Earlier versions, the EOWPVT and the ROWPVT were included in the study in addition to the PPVT-3 and its counterpart the expressive vocabulary test. Participants were 31 children

aged between four and five years with specific language impairment and 31 children in an age matched control group. In terms of intercorrelations, scores on both the EOWPVT and ROWPVT had moderate to high correlations with scores on the other measure of vocabulary ranging from 0.52 to 0.77. The authors concluded that, although these measures of vocabulary showed good construct and convergent validity, they may not be the best approaches to screening for specific language impairment as the screening accuracy was poor, that is, the tests could not accurately predict specific language impairment status. This study raised another important issue regarding the reliability of vocabulary measures. Although these tests aimed to examine the same skills, the scores for individual children varied by up to one standard deviation between vocabulary tests. This meant that the estimated level of vocabulary development obtained for a child depended on which vocabulary test was given.

Internal consistency of the Receptive and the Expressive One-Word Picture Vocabulary tests is high at .90 (Brownell, 2010). No test-retest reliability data appears to exist.

*The Individual Growth and Development Indicator, Picture Naming test.*

Since 1996, the Early Childhood Research Institute on Measuring Growth and Development has developed a diverse set of language and early literacy measures for use with children from birth to age 8. These measures, known as Individual Growth and Development Indicators (IGDIs) are part of a general outcomes measurement approach (as opposed to a critical skills mastery approach). In other words, IGDIs are instruments that can be used to track progressive acquisition of skills rather than their mastery (Phaneuf & Benjamin, 2003). IGDIs measure with three characteristics: ease of use; efficiency of administration, scoring and interpretation; and provision of information that can be used to

make educational decisions. One of these IGDIs is the Picture Naming (PN) measure. This is a measure of expressive language. The Picture Naming task is administered simply by presenting coloured pictures one at a time to a child and asking the child to name them. The correct number of correct responses in 60 seconds is the child's score on the test.

A number of studies have validated the IGDI. For example, Bradfield et al. (2013) found a correlation of .70 between scores on the PN task and scores on the PPVT-4 in a study of 55 children aged between 3 and 6 years. Similarly, Missall and McConnell (2004) examined the validity of the PN task and reported correlations of .56 to .75 between scores on the PN and scores on the PPVT-3, and correlations of .63 to .79 between scores on the PN and scores on the Preschool Language Scales for children aged between 3 and 5 years. Test-retest reliability coefficients were moderate to low at .67 (Missall & McConnell, 2004).

#### *Expressive Vocabulary Test, 2<sup>nd</sup> Edition*

The EVT-2 (Williams, 2007) is a measure of expressive vocabulary and word retrieval. It has been designed to be used alongside the PPVT-4 to gain a measure of both expressive as well as receptive vocabulary. Like the PPVT-4 it is suitable for use with individuals aged 2:6 to 90+ years and has been standardised on a sample of 3,500 individuals (Williams, 2007).

The EVT-2 is individually administered by presenting a picture to the child on a testing easel and asking a stimulus question. The child then provides a one word response that either acceptably labels the picture, answers a specific question, or gives a synonym for the associated picture (Williams, 2007). The EVT-2 items increase in difficulty, in a fashion similar to that of the PPVT-4.

Williams (2008) published a comprehensive overview of studies prior to 2008 that have utilised the EVT-2. Studies included reliability and validity studies, studies of specific populations, and intervention studies in populations of children with autism, SLI, and other syndromes. The reliability and validity as well as the diagnostic accuracy of the EVT-2 were reported to be satisfactory in all of the studies reviewed.

#### *Renfrew Word Finding Vocabulary Test*

The Renfrew Word Finding Vocabulary Test (Renfrew, 1997) is a measure of expressive vocabulary that is designed to be used with children aged three through to eight. Due to its simplicity, the Renfrew can be administered quickly and easily. There are 50 items in the test, each of which is presented on black and white picture cards. Each item is presented to the child one at a time for them to name. The items increase in difficulty in a similar fashion to that of the PPVT-4. The child's score on the Renfrew is the total number of correctly named items.

There are only a small number of studies that have utilised the Renfrew. In an Australian longitudinal study of 587 indigenous children, the Renfrew was one of two vocabulary measures used to gain a picture of development in children of this population over time (Buckley, Underwood & Purdie, 2009). The authors described the Renfrew as a useful tool that can provide teachers and parents with ongoing information regarding vocabulary development. More comprehensive reliability and validity data is not available for the Renfrew.

#### *Junior Oral Language Screening Tool*

The JOST (Keaney, Britain, & Hunt, 2003) is a measure of expressive language with a focus on grammar, pragmatics, and vocabulary. It is a screening tool that is used to assess

oral language in children who are in Year 0-2 of primary school. It was designed to gain additional information on a child's oral language development to determine whether any additional support is necessary. It is widely used across primary schools in New Zealand. It is cost free, easy to administer, and can be downloaded from the Ministry of Education website. There is no training necessary to administer the JOST other than reading a brief instruction. In the vocabulary section of the JOST, the child is asked to name as many animals as he/she can. The teacher records the number of correctly named animals in one minute (Keaney, Britain, and Hunt, 2003)

The JOST has a number of shortcomings. There is no standardised administration procedure available. There is no information or research on reliability and validity. There are no clear guidelines for the interpretation of an individual child's score, which means that interpretation depends on a teacher's subjective judgement. Overall, there is no data that supports the JOST as an effective screening tool for new entrant children in New Zealand.

#### *Test of Language Development-Primary, 4<sup>th</sup> Edition*

The TOLD-P:4 (Newcomer & Hammill, 2008) is a comprehensive assessment of nine different aspects of oral language including Picture Vocabulary, Relational Vocabulary, Oral Vocabulary, Syntactic Understanding, Sentence Imitation, Morphological Completion, Word Discrimination, Word Analysis, and Word Articulation Picture Vocabulary (Newcomer & Hammill, 2008). All nine subtests take 30-60 minutes to administer and are designed for use with children aged between four years and eight years.

A test review by Bradley-Johnson (1998) of an earlier edition – the TOLD-P:3 – described the technical adequacy of the test. Standardisation was adequate with a norming sample of over 1000 children, including a good number at each age level, from 28 states across the United States. The TOLD-P:3 possesses high internal consistency (all subtests



above .85) as well as a high degree of test-retest reliability. The criterion related validity of the TOLD-P:3 was also reported to be adequate.

The TOLD-P:4 and previous editions have been widely used in a number of studies examining oral language in primary school aged children. Recently, a study by Snow et al. (2014) described the impact of teacher professional development in disadvantaged schools in Victoria, Australia. The subtests of the TOLD-P:4 were used as the pre and post test measures of oral language in 1254 children in grades 1-3 of primary school. This study supports the use of the TOLD-P:4 in populations of young children.

#### *Illinois Test of Psycholinguistic Abilities, 3rd Edition*

The ITPA-3 (Hammill, Mather, & Roberts, 2001) is a measure of spoken and written language in children and can be used for children aged 5 through to 12 years. The ITPA-3 is composed of 12 subtests, with all subtests together taking 45 to 60 minutes to administer. An arrangement of different subtests of the ITPA-3 can be combined to form 11 different composite scores each of which are faster to administer and have different clinical uses, for example, the morphology and syntax composites can be administered together to make up a grammar composite.

The technical aspects of the ITPA-3 were outlined in a test review by Yanosky et al. (2004). Standardisation was based on a representative sample of 1522 students across 27 states in the United States during 1999 and 2000. The ITPA-3 was found to have strong coefficients for internal consistency, test-retest reliability, and inter-scorer reliability. Construct validity and criterion validity in terms of the accuracy of the ITPA-3 in predicting a subject's future performance were both reported to be high.

## **Test Selection**

Each of the reviewed vocabulary tests were considered for inclusion in the present study. The selection criteria used for the present study were as follows: 1) Is the test suitable for new entrant aged children? 2) Does the test possess adequate psychometric properties? 3) Does the test have a relatively short administration time? 4) Is the test easy to administer, score, and interpret? 5) Is the test readily available to the researcher? The results of this selection process are reported in Table 1.

Table 1: *Selection criteria for potential vocabulary measures.*

	Age	Admin.Time (Minutes)	Available	Inclusion
<b>Receptive Vocabulary Tests</b>				
Peabody Picture Vocabulary Test, 4 <sup>th</sup> Ed.	2:6-90+	10-15	✓	✓
Two Question Vocabulary Measure	4-8	50-55 (Whole Classroom)	✓	x
Bracken Basic Concept Scale - Revised	2:6-7:11	10-15	✓	✓
Testyourvocab	5+	5-10	✓	✓
Receptive One-Word Picture Vocabulary Test, 4 <sup>th</sup> Ed.	2-70+	15-25	x	x
<b>Expressive Vocabulary Tests</b>				
Expressive One-Word Picture Vocabulary Test, 4 <sup>th</sup> Ed.	2-70+	15-25	✓	x
Individual Growth and Development Indicator, Picture Naming	2:6-5:6	1	✓	✓
Expressive Vocabulary Test, 2 <sup>nd</sup> Ed.	2:6-90+	10-20	✓	x
Renfrew Word Finding Vocabulary Measure	3-8	5-10	✓	✓
Junior Oral Language Screening Tool	4:6-5:6	Unavailable	✓	x
<b>Oral Language Tests</b>				
Test of Language Development-Primary, 4 <sup>th</sup> Ed.	4-8:11	30-60	x	x
Illinois Test of Psycholinguistic Abilities, 3 <sup>rd</sup> Ed.	5-12:11	45-60	x	x

The following tests were selected for the present investigation: The Peabody Picture Vocabulary Test (4<sup>th</sup> Ed.), the IGDI Picture Naming Test, the Renfrew Word Finding Vocabulary Test, the Bracken Basic Concept Scale - Revised, and the Testyourvocab procedure. The PPVT-4 was used as the gold standard measure of vocabulary against which the other tests would be compared.

### **Aims of the Present Study**

The present study sought to identify a procedure for assessing the vocabulary levels of new entrant children which is both sufficiently accurate to identify children with delayed vocabulary development while still being economical in terms of teacher time.

## **Chapter 2**

### **Method**

#### **Setting**

Participants for the present study were recruited from four primary schools located within the Christchurch urban area. Three of the schools in the study had decile ratings of 5 and one school had a decile rating of 3. Decile ratings in New Zealand are a 10 point scale (1-10) based on census data regarding the socio-economic status of the households in the school catchment area. A decile rating of 10 is the highest and a decile rating of 1 is the lowest.

Testing took place in either the school's library or in a small resource room that had been selected by the school. Each testing area contained a large desk and several chairs. These areas were well-lit and designed to minimise distractions. Only the researcher and the individual child being tested were present at each testing session.

#### **Participants**

Forty eight new entrant children were recruited for the study (20 boys and 28 girls). All were aged between 60 months and 65 months at the time of testing. There were two selection criteria for the inclusion of participants in the study. First, only children who had been attending primary school for four months or less were invited to participate in the study by the Year 1 teacher. Secondly, children who did not speak English as their first language were excluded from the study.

Complete data was obtained for 46 children. Only partial data was collected for the remaining two children; one child did not wish to continue and the other child was absent for part of the testing process. The data collected for these children was excluded from the study and not included in any data analysis.

## Testing Materials

An Apple iPad 2 was used to administer the IGDI Picture Naming test and the Testyourvocab test of vocabulary size. For the IGDI Picture Naming test the iPad was displayed on a desk within close proximity to the participating child and the child was given the task of swiping from one picture to the next. The IGDI Picture Naming test consists of four separate tests, each with 17 items (2 practice items and 15 test items) depicting everyday items. Each item is presented individually. The iPad was utilised in the present study for two reasons. Firstly, the testing easel for the IGDI was difficult to turn through quickly and secondly, the researcher believed that it would be useful to observe how the children interacted with the iPad in a testing situation. For the Testyourvocab procedure the iPad was placed in front of the administrator.

For the PPVT-4 and the Bracken, the testing easels were displayed on the table between the participating child and the administrator; the child was able to view the testing materials while the administrator's record forms were hidden from view. The PPVT-4 consists of 228 coloured items which are spread across 19 different 12-item sets. Sets 4 to 13 were used for the children in the present study.

The testing materials for the Renfrew were placed in front of the participating child. The Renfrew Word Finding Vocabulary Test consists of 50 black and white picture cards with one test item per card. The cards depict everyday objects.

In order to monitor the administration time of the tests, the timer function of the researcher's smart phone was used.

## Procedures

*Ethical Approval.* Ethical approval for the study was obtained from the Educational Research Human Ethics Committee (ERHEC) at the University of Canterbury. This approval is shown in Appendix 1.

Prior to data collection, information sheets and consent forms were distributed and consent was obtained from the school principal and board of trustees, the Year 1 teachers, each child and the parents of each child taking part in the study. These information sheets and consent forms are reproduced in Appendix 2.

*Locating Participants.* A list of schools in the Christchurch area was obtained from the Ministry of Education website. This list included up to date information on school contact details, current school principals, physical address, school decile level, and number of pupils enrolled. Larger schools (those with 300 pupils or more) were targeted in order to reduce the number of schools that needed to be recruited. Schools were targeted systematically to increase the likelihood of obtaining a sample that was dispersed across the Christchurch area and had a spread of decile levels.

*Recruitment.* Initial contact with schools was undertaken in person and a hard copy of the introductory letter inviting the school to participate in the study was given to the school principal for consideration. This letter is reproduced in Appendix 3. Approximately two school days later, the school was contacted again by phone, to inquire whether or not the school would be willing to participate in the study. Once a school had decided to participate, a meeting was set up to explain the details of the research project to teachers and the school principal. In this meeting consent forms for the school principal and Board of Trustees, teachers, parents, and children were given to a staff member nominated by the school.

Testing commenced when a sufficient number of signed parent consent forms had been returned to the school.

*Test Administration.* Assessment of each child who participated in the study was spread over two separate occasions on consecutive days of the school week. Each testing session took no more than 30 minutes. Tests were administered to each participant in the same order each time. Participants were tested with three of the tests on the first day: the Peabody Picture Vocabulary Test, the Renfrew Word Finding Vocabulary Test, and the IGDI Picture Naming test. On the second day, participants were assessed with the Bracken Basic Concept Scale – Revised and Testyourvocab tests. The purpose of spreading the tests across two separate days was to reduce the likelihood of the children losing concentration or interest. Following withdrawal of the Testyourvocab procedure, the tests were split to have the PPVT-4 and the Renfrew on the first day of testing and the Bracken and the IGDI on the second day of testing in order to keep administration time similar across both testing days.

Administration time was measured for each of the tests for each child. The smart phone stop watch was started just prior to the participant engaging with the practice items for each test and stopped as soon as the test stop criterion was reached.

At the conclusion of each testing day, participants were allowed to choose one of several small rewards such as a sticker sheet, bouncy ball, or bracelet.

*Peabody Picture Vocabulary Test, 4th Edition.* Each item in the PPVT-4 consists of four different pictures; the test administrator says a word and the participant is asked to indicate which of the four pictures being presented best represents the spoken word. Testing discontinues when the participant makes 8 or more errors in a set. The PPVT-4 was administered in accordance with the standardised testing procedure described in the testing manual. All participants were tested using Form A of the PPVT-4 and all began the test at Set



5 - the starting set for children aged five years. No child proceeded past set 13. Raw scores were converted to standard scores and percentiles using the norms for the 5.0-5.6 age range in the testing manual.

*The Renfrew Word Finding Vocabulary Test.* Items in the Renfrew are presented one at a time and the participant is required to name each item. If five consecutive errors are made, the participant is then presented with all five of those items and asked if they know what any of them are. If one of the five pictures is correctly named, testing continues, if there is no correct response, testing ceases. The participant's score is the total number of correct responses. The administration of the test followed the standardised testing instructions included with the test.

*IGDI Picture Naming test.* In the IGDI, participants are required to correctly name each of the presented items as quickly as possible. If no response is given within three seconds, the child proceeds to the next item. The number of correctly named items within 60 seconds is the participant's score on the test. In this study, the standardised testing procedures were followed.

The IGDI consists of four tests as there is a preset test available for each of the four seasons of the year. In this study, the fall test was chosen as it was believed to have items that would be more likely to be recognised by children in New Zealand.

*The Bracken Basic Concept Scale – Revised.* The BBCS-R consists of 11 subtests. Each of these test a different educational concept. The first six of these concepts: colours, letters, numbers/counting, sizes, comparisons, and shapes comprise what is known as the School Readiness Composite (SRC). The SRC provides a composite score that indicates children's level of basic concept acquisition and receptive language skills. In this study the SRC was selected in favour of the full 11 subtests of the BBCS-R as the administration time

of the full BBCS-R is estimated to be over 30 minutes. For each subtest, items are presented orally by the administrator. The participant is required to identify the correct item located on the testing easel. In this study, each participant was tested in accordance with the standardised instructions provided by the BBCS-R.

*Testyourvocab.* The Testyourvocab test of vocabulary size was administered using an iPad 2 as it requires both a device and an internet connection to use. At step 1, Testyourvocab presents the user/participants with a list of 40 words of increasing difficulty. If the word is known or familiar to the participant a box is checked next to the corresponding word. Once the first page of words is complete, a second and larger list of words (Step 2) is presented based on the distribution of responses in Step 1. The same response procedure applies to Step 2. Step 3 requires the participant to input his/her age, gender, and whether English is a first or second language. Testyourvocab uses all of this information to generate an estimate of the participants total vocabulary size.

As there are no standardised instructions for the Testyourvocab procedure, both a brief set of instructions as well as a discontinue rule were made by the researcher and followed for each test. These are shown in Appendix 4. Prompting questions were used by the administrator to ascertain whether the child knew or was familiar with each word, for example “Can you show me a *window*?”.

Testyourvocab was administered for the first 10 participants, some of whom had difficulty understanding what was required and some of whom gave ambiguous responses to various items. The researcher decided to remove Testyourvocab from the study on the grounds that it was difficult to tell whether or not the child was responding accurately to the question “Do you know what this word means?”

## **Data Analysis**

Data for all participants was recorded and stored using the statistical software: IBM SPSS Statistics, version 22. The following statistical analyses were also performed using IBM SPSS statistical software.

The concurrent validity of the Renfrew, Bracken, and IGDI was tested by the generation of a correlation matrix and examining correlations with the PPVT-4. Descriptive statistics were generated to examine the administration times of each of the tests. A series of Receiver Operating Characteristic (ROC) analyses using PPVT-4 scores as the criterion were used to examine the screening accuracy of the tests in the present study.

## **Chapter 3**

### **Results**

The results of the present study have been organised in the following order: a report on children's reactions to the tests, descriptive statistics of the administration times, results of the administration processes of the tests, individual participant results, intercorrelations, Receiver Operating Characteristic or ROC curves to identify the screening accuracy and optimal cut points, and lastly a description of the perspectives of Year 1 teachers who were involved in the present study is given.

#### **Children's Reactions**

Children reacted positively to all tests in the present study. However, there were tests that stood out as being more appealing than others in terms of how engaged and interested the child appeared. The most appealing test in the study for children was the IGDI Picture Naming test. Following the IGDI, children favoured the Renfrew. Following the Renfrew, children favoured the PPVT-4 and the Bracken – the two easel based tests. The least appealing test was the Testyourvocab procedure.

#### **Administration Time**

Recorded individual administration times for each of the tests are given in Table 2. The mean administration times demonstrate that the test that was the fastest to administer was the IGDI. The IGDI also produced the least variability in administration times. The next fastest was the Renfrew which yielded a small degree of variability in test times. Following the Renfrew was the Bracken which was faster to administer than the PPVT-4. The PPVT-4 took the longest to administer. Additionally, the PPVT-4 yielded the greatest variability in administration times.

Table 2. *Mean administration times in minutes for each of the four tests*

	N	Minimum	Maximum	Mean	SD
PPVT-4	46	04:50	25:25	11:00	03:25
Renfrew	46	03:05	07:13	04:36	00:55
Bracken	46	07:56	15:16	10:33	01:23
IGDI	46	00:34	01:00	00:50	00:07

### **Administration Processes**

Out of the five tests selected for the present study, four of these were able to be administered accurately to new entrant children. The exception was the Testyourvocab procedure. The issue with the Testyourvocab procedure was that the testing process did not elicit reliable responses from the participants and had to be removed from the study. Both the PPVT-4 and the Bracken provided a more defined assessment procedure. However, due to the length of administration and the use of testing easels, these were the tests that participating children most frequently became distracted on. The IGDI and Renfrew allowed a greater variability of practice during their administration.

The IGDI and the Renfrew were the simplest to administer and score. The IGDI however, has no normative data and the Renfrew has very little. This meant that the scores on these tests were more difficult to interpret in depth. The PPVT-4 and Bracken on the other hand provided norms and these allowed a more meaningful interpretation of the children's scores.

## Individual Results

The individual scores for all 46 participants on each of the vocabulary tests are presented in a table located in the appendices (Appendix 5). This data was used as the basis for all subsequent analyses in the present study.

## Intercorrelations

A correlation matrix was generated using the scores of the 46 children on each of the four vocabulary measures. These correlations are presented in Table 2. Significant intercorrelations were found for all of the vocabulary measures used in the present study. The test that produced scores that were most highly correlated with scores on the PPVT-4 was the Renfrew. Correlations between the PPVT-4 scores and the Bracken and the IGDI scores were weaker. The strongest correlation was that between the scores on the Renfrew and the scores on the IGDI.

Table 3. *Pearson correlations between each of the four measures of vocabulary*

Vocabulary Test	PPVT-4	Renfrew	Bracken	Picture Naming
Renfrew	.744**			
Bracken	.692**	.593**		
Picture Naming	.539**	.750**	.603**	

\*\* Correlation is significant at the 0.01 level (2-tailed).

## Screening Accuracy

Three Receiver Operating Characteristic (ROC) analyses were conducted to determine the screening accuracy of the Renfrew, Bracken, and IGDI using the PPVT-4 scores as the criterion. A criterion of 1 standard deviation below the mean on the PPVT-4 –

or the bottom 16 percent of cases – was used as the cut-point to identify children with delayed vocabulary. The rationale for this cut-point is that it has been used as the cut-point in similar studies that have identified the prevalence rates of children with delayed reading skills (Catts, Compton, Tomblin & Bridges, 2012).

ROC curves represent – in the form of a plot – the true positive rate (sensitivity) against the false positive rate (1- specificity) for each possible cut off point on the test. The performance of the Renfrew, Bracken, and IGDI is illustrated by three ROC curves. These are presented in Figures 2, 3, and 4 respectively. In each case the diagonal line represents an area under the curve value of 0.5.

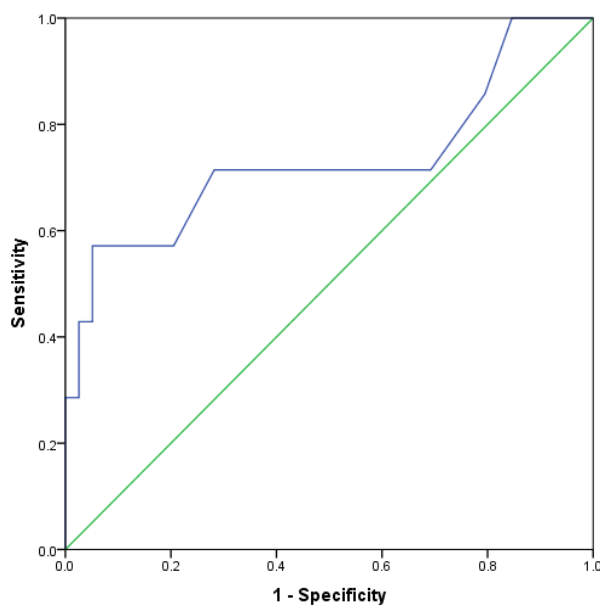


Figure 2: ROC Curve displaying the performance of the Renfrew in identifying participants according to the cut off criterion. T

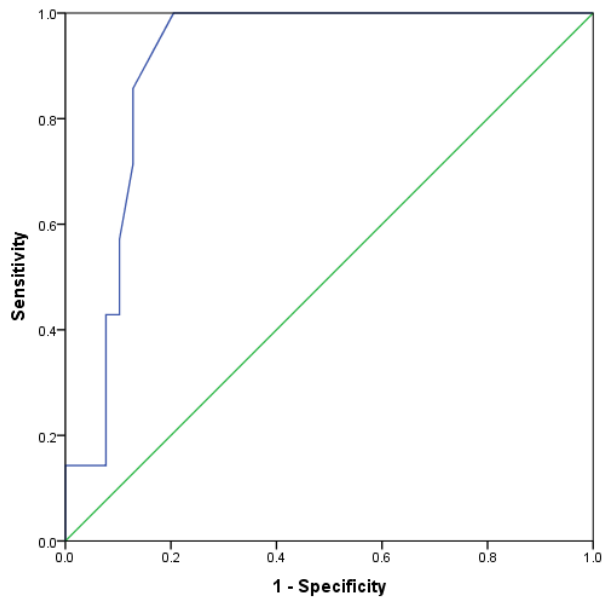


Figure 3: ROC Curve displaying the performance of the Bracken in identifying participants according to the cut off criterion.

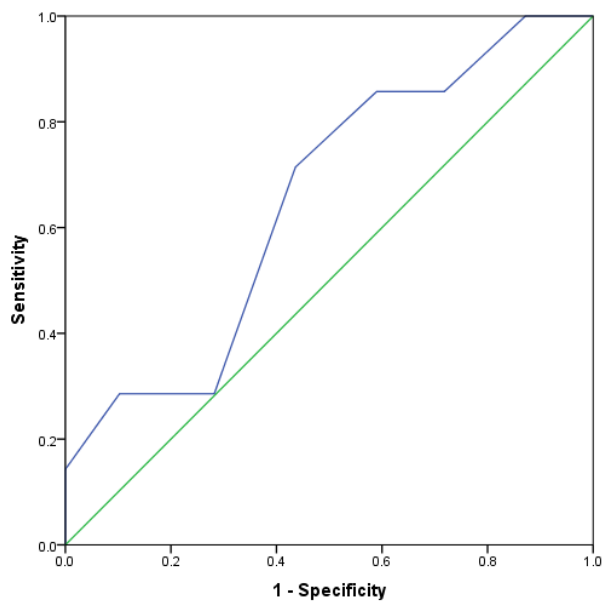


Figure 4: ROC Curve displaying the performance of the IGDI in identifying participants according to the cut off criterion.



The screening accuracy of a test as a discriminating tool is represented by an area under the ROC curve value (AUC) which is represented as a proportion. An AUC value of 1.0 indicates a test with perfect screening accuracy (that is, it correctly identifies all cases). Whereas an AUC value of 0.5 indicates a test that fares no better than chance (Tarren-Sweeney, 2013).

ROC analyses were also performed to determine the optimal cut-points for each of the tests. Determining the optimal cut-point of a test relies on a trade-off between *sensitivity* (the proportion of cases correctly identified) and *specificity* (the proportion of non-cases). In screening for adverse outcomes such as delayed vocabulary development, sensitivity is more important than specificity (Tarren-Sweeney, 2013). Failing to detect many cases is more costly in the long term than failing to detect non-cases as non-cases. The screening accuracy (AUC values) and optimal cut-points for each of the tests are shown in Table 4.

Table 4. *Screening accuracy and optimal cut-points for each vocabulary test*

Vocabulary Test	Area under ROC curve	Estimated population prevalence	Screening cut-point	Sensitivity % (Number of cases correctly identified per 1000 children)	Specificity % (Number of non-cases correctly identified per 1000 children)
Renfrew	.731	16%	1	71.4% (114/160)	71.8% (603/840)
			2*	85.7% (132/160)	20.1% (169/840)
			3	100% (160/160)	15.5% (130/840)
Bracken	.905	16%	1	85.7% (132/160)	87.2% (732/840)
			2*	100% (160/160)	79.95% (672/840)
			3	100% (160/160)	71.8% (603/840)
IGDI	.652	16%	1*	85.7% (132/160)	41% (344/840)
			2	85.7% (132/160)	28.2% (237/840)
			3	100% (160/160)	12.8% (108/840)

\*Optimal cut-point for each vocabulary test.

Using this procedure, the second cut point for the Bracken is the most accurate discriminating tool in identifying children with delayed vocabulary according to the PPVT-4. This cut point allows for the identification of 100 percent of children with delayed vocabulary while incurring a reasonably small number of false positives. The AUC value for the Bracken is high. The second cut-point on the Renfrew is the most accurate cut-point for the Renfrew. The first cut-point on the IGDI is the most accurate cut-point for the IGDI. The optimal cut-points for the Renfrew and IGDI are much less accurate in identifying non-cases than the optimal cut-point on the Bracken.

### **Teachers' Perspectives on Vocabulary Testing**

In response to questions asked by the researcher, a number of the new entrant teachers involved in the present study reported on their schools perspectives on vocabulary testing in new entrant classrooms. A majority of the participating schools did not specifically assess vocabulary at the new entrant level and instead focused on pre-reading skills. One school reported “at this school, we do not test for any oral language at that age”. Other schools reported more of a safety net approach: “some vocabulary testing is done with lists of high frequency words; for a few that are clearly falling behind we might screen using the JOST”. One school reported that they “rely on the Record of Oral Language and the 6-Year net to pick up children who may be struggling with vocabulary”. One school reported a more systematic approach by using a 3 page list of high frequency words that each child would be expected to know the meanings of after a few months of being at school. It is important to note the both the wide variety of approaches used by each school and the wide range of testing materials and methods being used.

Teachers in the present study also commented on their experiences with the SEA as a standardised assessment tool for new entrants. Common complaints were that it was “time

consuming”, “complicated”, “something we quickly stopped doing”, and “in a big school like this, it was just too hard to get around all the children. We only have a few hours here and there to do it”. For many teachers, the clear issue is the time constraints of a busy classroom.

When asked about whether or not they thought a brief tool for assessing vocabulary would be useful, all teachers agreed that they would find it useful, with one teacher commenting that “there is a real need” for such a tool.

## **Chapter 4**

### **Discussion**

The aim of the present study was to explore the accuracy of existing vocabulary measures suitable for new entrant children to discover if there is an accurate and economical procedure that can be used to identify children with limited vocabulary who are in need of remediation. The impetus for this research emerges from the lack of systematic vocabulary screening in schools despite the evidence in the research literature of a strong relationship between vocabulary knowledge and success in learning to read

Children need to learn to read in a timely manner; therefore it is important that children with delayed vocabulary are identified for early intervention at a time that will be most beneficial to them. The time that it is most beneficial to identify children with delayed vocabulary is as soon as it is possible to do so during the first year of schooling. Research into the Matthew Effect in reading and the Fourth Grade Slump demonstrate that a small initial disadvantage in vocabulary knowledge may turn into a greater disadvantage as reading demands increase throughout the schooling years. Therefore, intervention must take place at an age where success is most likely. A child identified as having a delayed vocabulary could receive remedial reading instruction and support that will increase the chances of reading success and all over academic success.

With any test that is used as a screening tool to identify children with delayed vocabulary, there are costs and benefits in relation to the accuracy of the test. There are four possible outcomes in screening: true positives, true negatives, false negatives, and false positives. A true positive occurs when a child who has delayed vocabulary is correctly identified as having a delayed vocabulary. It is of the utmost importance that a test maximises true positives and functions to identify all children who are in need of remedial

instruction. True negatives occur when a child who has normal levels of vocabulary is identified as having normal levels of vocabulary. A false negative occurs when a test identifies a child as having normal vocabulary when in fact they have a delayed vocabulary. False negatives are costly. False negatives miss children who are in need of remedial support and therefore increase the likelihood of future reading failure for that child. It may be some time before – if at all – the missed child who has delayed vocabulary is picked up. By that time, it may be very difficult for that child to catch up to his or her peers. False positives occur when a test identifies a child as having delayed vocabulary when in fact the child has a normal vocabulary level. The cost of a false positive is that a child may end up receiving remedial instruction and support when it is not needed. Overall, however, false positives are less costly than negatives. The cost of missing a child with delayed vocabulary far outweighs the comparatively small cost of providing remedial instruction for a short period until the teacher notices that this is not required.

In selecting a potential screening test for delayed vocabulary, screening accuracy (that is the ability to identify children with delayed vocabulary development) is of paramount importance. Additionally, the test needs to be easy to administer, score, and interpret. It also needs to be quick to administer. If the test is to be used by classroom teachers it needs to be possible to accurately screen every child in the classroom in an economical way. For the present study, five tests were selected that might have been suitable for this task. The investigation asked: Is the test suitable for children of this age? Does it possess adequate psychometric properties? Can the test be administered quickly? Is the test easy to administer, score, and interpret? And, is the test readily available? The chosen tests were: the PPVT-4, which was selected as the standard against which other tests would be assessed, the Renfrew - Word Finding Vocabulary Test, the Bracken Basic Concept Scale – Revised, the Individual Growth and Development Indicator – Picture Naming test, and the Testyourvocab procedure.

Each child in the present study (n=46) from within the Christchurch area was individually assessed across two days of testing for each of the selected tests.

Results indicated, firstly that the test that children liked the best was the IGDI Picture Naming test. The appeal of the IGDI was largely due to using an iPad to administer the test. Children picked up the process of naming the pictures and swiping the screen with ease. This process was more engaging for the children than the other tests; rather than needing to sit at a desk and be asked a great number of questions, the child was a more active participant in the testing process.

The test that was the fastest to administer was the IGDI followed by the Renfrew. Both the IGDI and the Renfrew could be administered in their entirety in just a few minutes. Both of these tests could be administered to a large number of children in a small amount of time by classroom teachers or other staff. Because the testing procedure is short, it is less likely to interfere with other classroom activities. The PPVT-4 by comparison, took the longest test to administer. This is because the PPVT-4 has many more items than the IGDI and Renfrew. Also the PPVT-4 was the only test to have item sets (of 12 items per set), which meant that for each progression into a new set, the administration time extends. As a consequence, the PPVT-4 can take significantly more time to administer.

The tests that were easiest to administer were both the IGDI and the Renfrew. For these tests, the method of assessment is simple and could be followed by someone with little training in test administration. Each item is simply presented to the child and the number of correct answers is the child's score on the test. By comparison, the PPVT-4, Bracken, and the Testyourvocab procedure were more complicated to administer, although they did provide more structure for testing. Scores on the PPVT-4 and the Bracken could also be interpreted in a more meaningful way. In the present study, the Testyourvocab procedure was removed

because the responses of children who had just turned five were often difficult to classify. Possibly, it could be used with 6-7 year olds.

The test that produced scores that were most highly correlated with the PPVT-4 was the Renfrew. The correlations that were found between scores on the Bracken and IGDI with scores on the PPVT-4 were weaker. They were however comparable to those found in previous studies (Bradfield, 2013; Breen, 1985).

## **Conclusions**

The test most suitable in addressing the aims of the present study is the Bracken Basic Concept Scale –Revised. In terms of test accuracy, the Bracken has high screening accuracy when identifying children with delayed vocabulary according to the PPVT-4. The sensitivity of the Bracken is high enough to be able to identify a high proportion of cases of delayed vocabulary using the PPVT-4 as the criterion. The specificity of the Bracken is reasonable but not ideal. There are practical implications if the Bracken were used as a screening tool with this level of specificity. In order to identify most cases of delayed vocabulary development this test would also identify many false positives – possibly as many as 32.8 percent of the five year old children being tested. If the Bracken had an administration time similar to that of the IGDI, this would be less of an issue. However, the Bracken is only a fraction faster to administer than the PPVT-4. It still takes around 10 minutes on average for each child.

The Renfrew and the IGDI showed some promise as potential screening tools in terms of practicality. These tests could be used easily in the classroom in an economical way. However, when examining the screening accuracy of both of these tests, there are significant short comings. Both tests had inadequate screening accuracy and as such would produce large numbers of screening errors. There are aspects of the IGDI and the Renfrew that are

appealing, but the conclusion is that neither test would be a suitable screening tool for identifying delayed vocabulary.

In summary, none of the tests that have been piloted in the present study would be suitable tests that could be used to assess the vocabulary development of new entrant children in an accurate and economical way.

### **Unanswered Questions**

The findings of the present study leave a number of questions unanswered. Firstly, as the literature suggests, almost all early vocabulary development takes place in the home environment. By the time children begin primary school, there are already significant differences between children in terms of vocabulary development. Therefore, should the vocabulary development of children be examined or assessed even earlier – in early childhood education? And should early childhood education teachers be trained to assess vocabulary development more systematically? Currently, within New Zealand's Early Childhood Education curriculum there is an emphasis on communication and language skill development but no specific focus on vocabulary development (Ministry of Education, 1996). There may be benefits of including a focus on vocabulary into the curriculum such as an increased awareness among early childhood teachers of the consequences of delayed vocabulary development and the possibility of providing assistance at an early age. On the other hand, some parents and teachers may disagree with placing such an emphasis on vocabulary development at this age.

Another question is that of why classroom teachers are not assessing vocabulary at Year 1 in a systematic fashion. The general finding in this study in terms of teachers' perceptions is that there is a broad range of approaches towards vocabulary assessment. Because there are no mandatory or recommended approaches to vocabulary testing at this



age, it is up to the individual school or classroom teacher to choose how to approach it. There are a number of factors that may be contributing to the wide range of approaches to vocabulary testing at this age, for instance, the resources available to the school, the number of staff available, funding, access to specialist services, access to testing materials, and perhaps most importantly spare time in an already busy classroom. The culture of the school will also influence the approach. To what extent does the school see this as something that should be assessed? An argument can be made that if teachers were to assess the vocabulary development of all new entrant children near the point of school entry, many more children who have delayed vocabulary could be identified and supported.

Another question to consider is: should teaching decisions be made on the results of a single test administration? It is clear from the results of the present study that it is difficult to measure accurately the vocabulary development of individual children at the age of 5 years. This problem could be overcome in several ways. Teachers could use a two stage approach of a screening tool followed by a more comprehensive test. Or teachers could use a tool which can be repeated at intervals across the year to track and follow up progress. Or teachers could use the same comprehensive test twice at, say, 6 month intervals. Or teachers could combine psychometric testing with the judgement of experienced teachers.

Another question that should be considered concerns the construct validity of the PPVT-4. The present study assumed that the PPVT-4 is the most robust receptive vocabulary test available. However, Gray, Plante, Vance, and Henrichsen (1999) found that a child's score on one receptive vocabulary test could vary by more than one standard deviation from that on another vocabulary test – this included scores on the PPVT. These authors concluded that an estimation of vocabulary knowledge for a child depends on which vocabulary test is used. If it were found that the PPVT-4 does not, in fact, accurately capture the level of

vocabulary knowledge of five year olds then it is possible that other vocabulary tests may provide a more accurate than that reported in this study

### **Limitations and Possible Next Steps**

There are a number of limitations in the present study. One of the limitations is the small sample size. A study of this nature would ideally have many more participants in order to draw accurate conclusions regarding the distribution of vocabulary knowledge at this age level. Furthermore, it would also have been beneficial to have a broader sample including a greater number of schools from a greater number of areas across New Zealand. A small sample limits the generalisability of the results. Future studies of a similar nature to the present study would benefit from a larger sample size. For a Masters thesis study, however, there are constraint which make the testing of larger samples difficult. However, there is enough data in the present study to draw conclusions on the relative strengths and weaknesses of the different tests and their suitability for use at the new entrant level.

A further possible limitation is the limited test administration experience of the researcher. One or two trial administrations of each of the tests were carried out prior to data collection in order to familiarise the researcher with the testing procedures for each test. However, there is always the possibility that accuracy of individual test results may have been influenced due to the limited experience of the author – especially during administration of the Testyourvocab procedure.

Another limitation of the present study is the small number of tests that were piloted in this study. There are many other vocabulary tests that were not included in the study that may be more adequate in terms of screening for vocabulary development. Eight tests were excluded from the study and several others are in existence. It is possible that a test that was

not included in the study would have better met the aims of the study. Cost constraints limited the number of tests that were available to the researcher.

Given that there is no systematic method for assessing the vocabulary development of children at this age in New Zealand, another unanswered question is: should New Zealand develop and standardise its own receptive vocabulary test for new entrant children? And if it so, what would such a test look like? Findings in the present study suggest that such a test needs to be one that is simple to use in the classroom environment and one that can be administered quickly. A test that takes too long to administer is simply not practical for the classroom setting. A New Zealand version of the IGDI with a 2-minute rather than a 1-minute time limit might be worth exploring. Such a test would have the added benefit of being affordable, readily distributable across schools, easier to administer and score, as well as being of interest to most children. This test could be administered at intervals across the school year by classroom teachers or other school staff in order to more accurately assess vocabulary development. It could also be used to monitor rate of vocabulary growth.

## **Final Conclusions**

The aim of the present study was to determine whether it were possible to develop a procedure for assessing the vocabulary development of new entrant children in an accurate and economical way. Of the five tests that were piloted in order to address this aim, the Bracken Basic Concept Scale - Revised was the most suitable. However, a longer administration time and less than ideal specificity rules the Bracken out as a screening tool. A number of possible next steps have been discussed including the possibility of developing a standardised receptive vocabulary test for New Zealand children using the findings of the present study.

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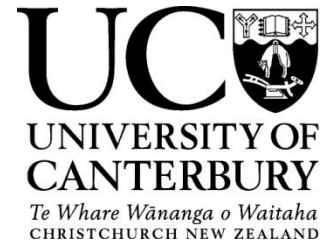


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## APPENDIX 1

### Ethical Approval



#### HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen  
Email: [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz)

Ref: 2014/29/ERHEC

28 July 2014

Brent Hastie  
School of Health Sciences  
UNIVERSITY OF CANTERBURY

Dear Brent

Thank you for providing the revised documents in support of your application to the Educational Research Human Ethics Committee. I am very pleased to inform you that your research proposal “A vocabulary assessment for new entrants” has been granted ethical approval.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 15 July 2014.

Should circumstances relevant to this current application change you are required to reapply for ethical approval.

If you have any questions regarding this approval, please let me know.

We wish you well for your research.

Yours sincerely

A handwritten signature in black ink, appearing to read 'N Surtees', with a stylized, cursive script.

Nicola Surtees

**Chair**

***Educational Research Human Ethics Committee***

*“Please note that Ethical Approval and/or Clearance relates only to the ethical elements of the relationship between the researcher, research participants and other stakeholders. The granting of approval or clearance by the Ethical Clearance Committee should not be interpreted as comment on the methodology, legality, value or any other matters relating to this research.”*

F E S

## APPENDIX 2

### Information and Consent Forms

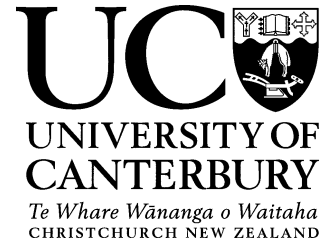
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#### **A Vocabulary Assessment for New Entrants Information Sheet for School Principals and to Inform Board of Trustees**

Dear Principal and Board of Trustee Members,

My name is Brent Hastie and I am carrying out a research project for my MA in Child and Family Psychology, on piloting a vocabulary assessment procedure for children in their first few months at school.

This letter is to formally request permission for your school to participate in this project. Participation would require the school principal and Year 1 teachers to identify children for me who have been in their first year of school between 1 and 3 months, and to pass on information about the study to their parents.

Following parental and child consent, I would then need to meet with children at your school who met the criteria for the study for two 30 minute sessions of testing or less in a quiet room. Testing would include up to four individually administered tests that examine vocabulary. The overall aim of the project is to examine the relative strengths of different screening measures by comparing them with a well established vocabulary test. The desired outcome of the study is to develop a vocabulary screening procedure that can be used easily and frequently by teachers, in a manner that is more economical than current methods.

All information and data collected throughout the study will be available only to myself and my supervisors. The confidentiality and anonymity of data will be assured through the use of pseudonyms, and storing information in a locked office or filing cabinet or in password protected electronic form. Parents will be asked their child's date of birth which is required only for the purpose of calculating his/her exact age at testing. The data from this project will be destroyed after five years.

Results will be reported as part of my Thesis, which will be submitted to the University of Canterbury as a piece of academic work to be marked. The thesis will be made publically available through the University of Canterbury library. I will provide you with a summary report on the findings of the study with copies of the test information to include in your records. Individual scores for children on one of the tests (PPVT-4) can be made available to

you providing parents have consented. A copy of this thesis could potentially be published in academic journals. None of these reports will identify yourself, staff members, parents or any children who participate in the study.

There is a small risk that doing the tests in the study could make some children feel anxious. If this occurs I will stop testing, and discuss this with the child and his/her parents before deciding whether to continue. There is also a risk that the tests might suggest a child could have learning difficulties (e.g. reading, attention or general intellectual ability). If this does occur, I will follow up with parents and teachers for advice.

All parents and children invited to participate in the study will be given an information letter, and their participation is entirely voluntary. Any child or parent may choose to withdraw at any stage without penalty. In this instance, I will do my best to remove any information relating to all of the relevant children.

If you have any questions please feel free to contact me by phone on 021 142 6830 or by email at [brent.hastie@pg.canterbury.ac.nz](mailto:brent.hastie@pg.canterbury.ac.nz). You can also contact my senior supervisor, Lawrence Walker by phone: +64 3 345 8153, Internal Phone: 44153, or by email at [lawrence.walker@canterbury.ac.nz](mailto:lawrence.walker@canterbury.ac.nz).

This study has been granted ethical approval by the University of Canterbury Educational Research Human Ethics Committee and any complaints should be addressed to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz).

Yours sincerely,

Brent Hastie

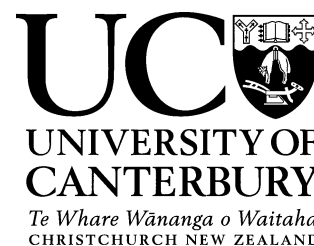
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## **A Vocabulary Assessment for New Entrants Consent Form for School Principal**

I have been given a full explanation of this research project and an opportunity to ask questions.

I understand what will be required of my school if I agree to take part in this project.

Provided parents give permission, I am happy to allow the researcher necessary time in classrooms as part of the project.

I understand that all information provided by participants, their parents, teachers, and the school will be kept confidential to the researcher with the project and that any published or reported results will not identify children, parents, teachers, or the school.

I understand that all data collected for this study will be kept in locked and secure facilities and/or in password protected electronic form, and will be destroyed after five years.

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I understand that participation is voluntary and that any child, parent, or our school may choose to withdraw at any stage without penalty. In this case, the researcher will do their best to remove any information relating to all of the relevant children.

If I have any questions, I can contact Brent Hastie or his senior supervisor, Lawrence Walker.

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By signing below I agree for my school to participate in this research project.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**PLEASE RETURN THIS SIGNED FORM TO THE SCHOOL OFFICE THE  
FOLLOWING DAY**



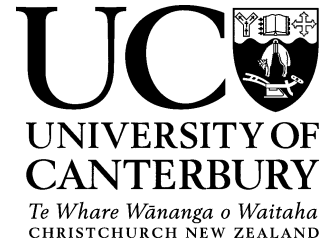
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Yours sincerely,

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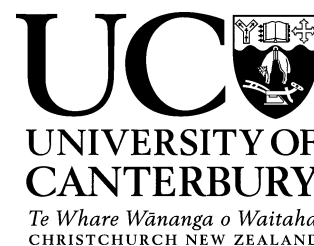
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**PLEASE RETURN THIS SIGNED FORM TO THE SCHOOL OFFICE THE FOLLOWING DAY**

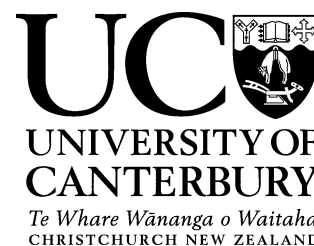
## College of Education

Brent Hastie

University of Canterbury

Tel: +64 3-366 7001 x44052, 021 142 6830

Email: [brent.hastie@pg.canterbury.ac.nz](mailto:brent.hastie@pg.canterbury.ac.nz)



### **A Vocabulary Assessment for New Entrants Information Sheet for Parents/Guardians**

My name is Brent Hastie and I am carrying out a research project for my MA in Child and Family Psychology. My project is on developing and testing a procedure that assesses vocabulary levels of children in their first few months at school.

I would like to invite you and your child to participate in this project. Your child has been selected because he/she has been in Year 1 of Primary School for between 1 and 3 months.

Participation would involve meeting with your child at his/her school on two or three occasions for up to 70 minutes in total of vocabulary testing in a quiet room. Testing would include up to four individually administered tests that examine vocabulary. The overall aim of my project is to look at the strengths of the different tests by comparing them with an already well established vocabulary test. The desired outcome of the study is to develop a vocabulary screening procedure that can be used easily and frequently by teachers, in a manner that is more economical than current methods.

Participation in this project is completely voluntary. If you decide to participate, you have the right to withdraw from the study at any time without penalty. If you withdraw, I will do my best to remove any information relating to you or your child, providing this is practically achievable.

All information and data collected throughout the study will be available only to myself and my supervisors. The confidentiality and anonymity of data will be assured through the use of pseudonyms, and storing information in a locked office or filing cabinet or in password protected electronic form. Your child's date of birth is required only for the purpose of calculating his/her exact age at testing. The data from this project will be destroyed after five years.

Results will be reported as part of my Thesis, which will be submitted to the University of Canterbury as a piece of academic work to be marked. The thesis will be made publically available through the University of Canterbury library. I will provide you with a summary report on the findings of the study and let you know how your child performed on each of the tests. Your child's principal and teacher would only have access to your child's scores on one of the tests (PPVT-4) if you give permission. A copy of this thesis could potentially be published in academic journals. None of these reports will identify yourself, your child, or

any staff members at your child's school who participate in the study.

There is a small risk that doing the tests in the study could make some children feel anxious. If this occurs I will stop testing, and discuss this with your child and yourself before deciding whether to continue. There is also a risk that the tests might suggest a child could have learning difficulties (e.g. reading, attention or general intellectual ability). If this does occur, I will give you advice on following this up.

If you have any questions please feel free to contact me by phone on 021 142 6830 or by email at [brent.hastie@pg.canterbury.ac.nz](mailto:brent.hastie@pg.canterbury.ac.nz). You can also contact my senior supervisor, Lawrence Walker by phone: +64 3 345 8153, Internal Phone: 44153, or by email at [lawrence.walker@canterbury.ac.nz](mailto:lawrence.walker@canterbury.ac.nz).

This study has been granted ethical approval by the University of Canterbury Educational Research Human Ethics Committee and any complaints should be addressed to The Chair, Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz).

Yours sincerely,

Brent Hastie

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### **A Vocabulary Assessment for New Entrants Consent Form for Parents and Guardians**

I have been given a full explanation of this research project and an opportunity to ask questions.

I understand what will be required of me and my child if I agree to take part in this project.

Providing I give permission, I am happy to allow the researcher the necessary time to work with my child in school as part of the project.

I understand that participation is voluntary for me and my child, and that I or my child may choose to withdraw at any stage without penalty. If I do so, the researcher will do his best to remove any information relating to my child.

I understand that any information provided by my child will be kept confidential to the researcher with the project and that any published or reported results will not identify me or my child.

I understand that all data collected for this study will be kept in locked and secure facilities and/or in password protected electronic form, and will be destroyed after five years.

I understand that a summary report on the findings of the study will be provided for me and I will be told how my child performed on each of the tests.

I understand that there is a small risk that the tests in the study might make my child feel anxious, or suggest the presence of learning difficulties, and that if this occurs the researcher will discuss this with me.

If I have any questions, I can contact Brent Hastie or his supervisor, Lawrence Walker.

If I have any complaints I can address these to the Chair of the University of Canterbury Educational Research Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or [human-ethics@canterbury.ac.nz](mailto:human-ethics@canterbury.ac.nz). Alternatively I can phone on +64 3 364 2987 ext: 45588.

By signing below I agree for my child to participate in this research project.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Email address: \_\_\_\_\_ Phone: \_\_\_\_\_

I am happy for my child's results on the PPVT-4 to be given to his/her school

☐ Yes

☐ No

My child's date of birth: \_\_\_\_\_

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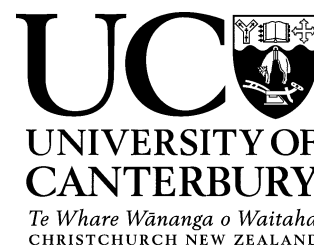
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## A Vocabulary Assessment for New Entrants Information Sheet for Children

Hello!

I'm Brent and I'm doing a project at the university. If you and your parents say it's ok, I'd like to come to your school and ask you some questions about words.

This is what we would do. I will come and meet you two or three times at one of the rooms at your school. I'll bring with me some pictures and questions that I will use to ask you about different words. For some of the questions, some of your friends in your class might come as well. After we have finished doing that I will tell your parents how you do. I will also tell your teacher and principal how you do on some of the questions if your parents say that's ok.

You will be given a secret code name so that no-one will know your name and how well you did on the questions, except us. We will keep the code name in a safe place.

If you ever get worried about anything, you can tell me or your parents. You can always change your mind about doing this and no one will be upset with you. All you have to do is to tell your parents or me.

I hope you would like to help with my project!

Brent

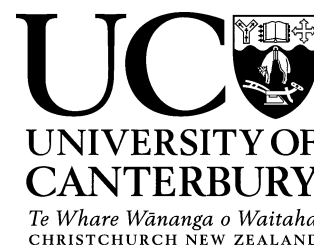
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### **A Vocabulary Assessment for New Entrants Consent Form for Children**

My Mum or Dad has told me about your project.

I am happy for you to come to my school and ask me questions about words.

I understand that this means that I will do some tests with you at my school.

I know that you won't tell anyone else about how I do, except my parents (and also my teacher if my parents say that's ok).

I understand that the things you find out about me will be kept safe.

I know that if anything makes me feel worried, I can tell you or my parents about it.

I understand that I can always change my mind about doing all this and no-one will mind.

I know that if I have any questions I can ask you or my parents.

Child's name: \_\_\_\_\_

Signed by child (or on behalf of child): \_\_\_\_\_

Date: \_\_\_\_\_

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## APPENDIX 3

### Letter to Principals

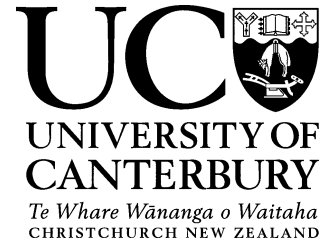
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The Principal  
Name of School  
Address  
Christchurch, 0000

Date

Dear Principal,

My name is Brent Hastie, I am a postgraduate student at the University of Canterbury in Christchurch. I am investigating the vocabulary development in young children as part of my Masters in Child and Family Psychology thesis. Research is increasingly showing that the speed at which children learn to read depends in part on the size of the child's vocabulary. I am looking to see if there is an existing vocabulary test which is quick, accurate, and can be easily administered by classroom teachers. I am conducting this research under the supervision of Dr John Church and Lawrence Walker. I am writing to request access and the possibility of your school being involved in this research.

I would like to work with children who have been attending Year 1 for up to three months. I would be assessing the children individually for two 30 minute sessions or less in an area of the school you have deemed to be appropriate. Permission will be sought from children and their parents prior to their participation in the research. Only those who consent and whose parents consent will participate. All personal information regarding participating children will be kept strictly confidential.

This study has been granted ethical approval from the Educational Research Human Ethics Committee.

I would be very grateful if you would consider my proposal to undertake part of this research in your school. If you require any additional information, please contact me. I will call again by phone in two days time.

Kind regards,

Brent Hastie

## **APPENDIX 4**

### **Testyourvocab Instructions**

I'm going to ask you some questions about words. I'm going to say a word, and you have to listen to that word and tell me what it means if you know. Some of the words might be a bit tricky, that's okay. If you don't know you can have a guess or just say "I don't know". Let's do a couple to start with:

Apple. The word is apple, tell me what apple means? (pause) Good work! You could say: an apple is a fruit, you can eat an apple, they can be red or green, and they grow on trees!

Let's try another one! This time, the word is 'water'. Can you tell me what water means? (pause). Great one! You could say: you drink water; you can see through water, you can swim in water!

Okay, now let's do some more!

Move to next test part after 5 consecutive missed words.

## APPENDIX 5

### Raw Scores of Participants on Each of the Vocabulary Tests – Sorted by PPVT-4

ID	PPVT-4	WFVT	BBCS-R	IGDI-PN
147	133	37	85	12
119	133	40	85	13
104	124	38	82	10
135	121	40	78	13
138	120	38	82	13
122	120	35	81	9
115	110	36	80	12
148	109	34	83	11
139	109	30	79	9
142	106	37	85	11
111	103	34	71	9
141	102	35	81	12
127	99	33	60	10
109	99	32	80	12
137	98	30	81	11
114	98	35	73	10
108	98	35	81	13
131	97	25	75	9
129	97	28	74	8
123	96	26	61	8
103	96	30	70	7
132	94	28	79	8
144	93	26	74	8
134	92	26	75	13
125	92	36	79	10
145	91	31	68	8
136	90	30	78	11
112	90	30	66	8
105	90	22	61	7
113	88	33	78	10
102	88	33	73	11
124	87	25	71	9
143	86	33	73	12
107	86	32	70	12
140	84	31	72	10
130	81	25	72	7
118	81	28	71	8

133	80	19	70	7
128	80	29	72	9
117	78	36	65	12
116	78	35	63	10
126	75	20	67	9
121	74	28	69	9
101	68	24	68	9
110	59	13	55	4
146	52	15	70	7

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